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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,287	10/23/2003	Richard E. Aufranc JR.	200312851	2349

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EXAMINER	
SIM, YONG H	

ART UNIT	PAPER NUMBER
2629	

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09/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/693,287	AUFRANC ET AL.	
	Examiner	Art Unit	
	Yong Sim	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/22/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/29/2007 has been entered.

Response to Arguments

1. Applicant's arguments with respect to claims 1- 50 have been considered but are moot in view of the new ground(s) of rejection.

2. With respect to Applicant's argument regarding creating image sub-frames from interlaced fields;

Applicant argues that "Katoh only mentions interlaced video in passing and has virtually nothing to do with the claimed subject matter.

Examiner respectfully agrees with Applicant that Kato teaches the progressive/(a noninterlaced scanning) technique in Para 0173.

However, Examiner respectfully disagrees with Applicant with respect to wherein Katoh does not teach any relationship between separate fields of interlaced video and sub-frames subsequently generated for wobulation.

Katoh teaches in Para 0174;

"It should be noted that if the panel is driven by an interlaced scanning technique, the scan lines on the screen are grouped into even-numbered lines/even field and odd-numbered lines/odd field."

In Para 0176;

"It should be noted that in the interlaced scanning technique, an image represented by a field may be processed similarly to an "image frame" as used herein."

As indicated above, Katoh clearly notes that an interlaced scanning technique or a non-interlaced scanning technique can be applied, and in an interlaced scanning technique a field is processed similarly to an "image frame." Since each frame generates sub-frames for wobulation as indicated in Para 0026, each field, which is processed similarly to an "image frame," will generate sub-frames in the similar manner as the "image frames" would. Thus, the cited paragraphs above indicate that the interlaced scanning technique, which is an alternative technique from the described non-interlaced technique in Katoh, teaches separate fields of interlaced video and sub-frames subsequently generated for wobulation as described by Applicant.

Therefore, all of the previous rejections with respected to generating the sub-frame images from interlaced images are maintained.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1 – 4, 10 – 12, 17 – 22, 28 – 30, 35 – 38 and 44 – 46 are rejected under 35 U.S.C. 103(a) as being anticipated by Katoh et al. (Hereinafter "Katoh" US 2003/0090597) in view of Endo et al. (Hereinafter "Endo" US 6,407,726 B1).

Re claim 1, Katoh discloses a display system (Fig. 1) for displaying an interlaced image frame, said interlaced image frame comprising a top field (Odd numbered lines)

and a bottom field (even numbered lines), said top and bottom fields each having lines of pixels, said system comprising (Para. 174):

an image processing unit configured to process a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generate a number of image sub-frames (Para 24; "a circuit for generating data representing multiple image subframes from data representing each image frame." Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.");

a modulator configured to generate a light beam bearing said number of image sub-frames (Para 24; "an image display panel including multiple pixel regions, each of which is able to modulate light); and

a wobbling device configured to displace said light beam such that each of said image sub-frames is spatially displayed offset from a previous image sub-frame (Para 24; "an image shifter for shifting, on the projection plane, a selected one of the multiple image subframes.);

wherein at least one of said image sub-frames is generated using only said pixel data elements in said top field and at least one of said image sub-frames is generated using only said pixel data elements in said bottom field. (Since each field is processed in the similar manner to a frame as explained above, it is inherent that the sub-frames will be generated from said top and bottom fields.)

But does not expressly teach wherein the sub-frames is spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a display system for displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Re claim 2, Katoh discloses the system of claim 1, wherein said image processing unit is configured to process said pixel data elements in said top field to generate a first image sub-frame and said pixel data elements in said bottom field to generate a second image sub-frame (Para 26; "the image subframes that make up an $n+1^{st}$ image frame are shifted on the projection plane." Multiple subframes are generated from an image frame, in which each image frame would consist of a

subframe. The first image frame (1st) consisting a "first image sub-frame," and the second image frame (n+1st) consisting a "second image sub-frame.")

Claim 3 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Re claim 4, Katoh discloses the system of claim 3, wherein said offset distance comprises a vertical offset distance and a horizontal offset distance, said second image sub-frame location being vertically offset from said first image sub-frame location by said vertical offset distance and horizontally offset from said first image sub-frame location by said horizontal offset distance (Para 197; "The direction in which the shift Ax of a light beam is created (which will be herein referred to as a "shifting direction") is the vertical direction of the image. The shifting direction of the light beam may also be the horizontal direction or a diagonal direction of the image.").

Re claim 10, Katoh discloses the system of claim 1, wherein said image processing unit is configured to:

process said pixel data elements in said top field to generate a first image sub-frame and a second image sub-frame;

and process said pixel data elements in said bottom field to generate a third image sub-frame and a fourth image sub-frame (Para 27; "the number of image subframes that make up each image frame is two.")

Re claim 11, Katoh discloses the system of claim 10, wherein:

said first image sub-frame is displayed in a first image sub-frame location;

said second image sub-frame is displayed in a second image sub-frame location;

said third image sub-frame is displayed in a third image sub-frame location; and

said fourth image sub-frame is displayed in a fourth image sub-frame location (Para 37; "the motion pattern includes shifting the image subframe to four or more different locations that are arranged in line.").

Claim 12 recites limitations that have been covered in claims 2 and 10. Therefore, it has been analyzed and rejected w/r to claim 2 and 10.

Re claim 17, Katoh discloses the system of claim 1, further comprising display optics configured to display said light beam on a viewing surface. (Abstract)

Re claim 18, Kato teaches a method of displaying an interlaced image frame, said interlaced image frame comprising a top field and a bottom field, said top and bottom fields each having lines of pixels (Para. 174), said method comprising: processing a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generating a number of image sub-frames corresponding to said top and bottom fields; and displaying each of said image sub-frames offset from a previous image sub-frame (Para 24; "a circuit for generating data representing

multiple image subframes from data representing each image frame." Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.").

But does not expressly teach wherein the sub-frames is spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a method for a display system displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Claim 19 recites limitations that have been covered in claim 1. Therefore, it has been analyzed and rejected w/r to claim 1.

Claim 20 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Claim 21 recites limitations that have been covered in claim 3. Therefore, it has been analyzed and rejected w/r to claim 3.

Claim 22 recites limitations that have been covered in claim 4. Therefore, it has been analyzed and rejected w/r to claim 4.

Claim 28 recites limitations that have been covered in claim 10. Therefore, it has been analyzed and rejected w/r to claim 10.

Claim 29 recites limitations that have been covered in claim 11. Therefore, it has been analyzed and rejected w/r to claim 11.

Claim 30 recites limitations that have been covered in claim 12. Therefore, it has been analyzed and rejected w/r to claim 12.

Claim 35 recites limitations that have been covered in claim 17. Therefore, it has been analyzed and rejected w/r to claim 17.

Re claim 36, Katoh teaches a system for displaying an interlaced image frame, said interlaced image frame comprising a top field and a bottom field, said top and bottom fields each having lines of pixels (Para. 174), said system comprising: means for processing a stream of pixel data elements sequentially corresponding to said pixels in said top and bottom fields and generating a number of image sub-frames corresponding to said top and bottom fields; and means for displaying each of said image sub-frames offset from a previous image sub-frame (Para 24; "a circuit for generating data representing multiple image subframes from data representing each image frame." Para 176; "It should be noted that in the interlaced scanning technique, an image presented by a field may be processed similarly to an image frame.").

But does not expressly teach wherein the sub-frames is spatially displayed offset from a previous image sub-frame by an offset distance less than a pixel width.

However, Endo teaches a display device having discrete fixed pixels and wobbling elements for wobbling a light beam emitted from the display elements for an interlaced display system wherein a sub-frame is displayed offset from a previous image sub-frame by an offset distance less than a pixel width (Endo: Col. 3, lines 1 – 10. See Fig. 3).

Therefore, taking the combined teachings of Katoh and Endo, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the

idea of having a wobbling method wherein the sub-frames are shifted less than a pixel width to achieve an oblique wobbling method as taught by Endo into the display system as taught by Katoh to obtain a display system for displaying an interlaced image wherein wobbling elements wobble image sub-frames to display the sub-frames offset from a previous image sub-frame by an offset distance less than a pixel width to achieve oblique wobbling to increase horizontal and vertical shifting of the pixels to achieve higher resolution for the NTSC system of the HD system (Endo: Col. 1, lines 43 – 64).

Claim 37 recites limitations that have been covered in claim 1. Therefore, it has been analyzed and rejected w/r to claim 1.

Claim 38 recites limitations that have been covered in claim 2. Therefore, it has been analyzed and rejected w/r to claim 2.

Claim 44 recites limitations that have been covered in claim 10. Therefore, it has been analyzed and rejected w/r to claim 10.

Claim 45 recites limitations that have been covered in claim 11. Therefore, it has been analyzed and rejected w/r to claim 11.

Claim 46 recites limitations that have been covered in claim 12. Therefore, it has been analyzed and rejected w/r to claim 12.

6. Claims 5, 23, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified teachings of Katoh and Endo, as applied to claims 1 – 4, 10 – 12, 17 – 22, 28 – 30 and 35 – 38 above, and further in view of Monti (US 6,680,748).

Re claim 5, the modified teachings of Katoh and Endo disclose the system of claim 2.

But fail to expressly disclose said image processing unit, which is further configured to:

process every other pixel data element in said top field starting with a first pixel data element in said top field to generate said first image sub-frame; and

process every other pixel data element in said bottom field starting with a second pixel data element in said bottom field to generate said second image sub-frame.

However, Monti discloses a spatial resolution reduction process wherein the pixel values in every other block are read out so as to perform a spatial resolution reduction by a factor of 2. (Fig. 3D, Col. 11, lines 25 – 37)

Therefore, taking the combined teachings of Katoh, Endo and Monti, as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the

display system as taught by Katoh and Endo to the spatial resolution process of Monti to obtain a display system processing unit which processes every other pixel data to generate image sub-frames to perform a spatial resolution reduction by a factor of 2.

Claim 23 recites limitations that have been covered in claim 5. Therefore, it has been analyzed and rejected w/r to claim 5.

Claim 39 recites limitations that have been covered in claim 5. Therefore, it has been analyzed and rejected w/r to claim 5.

7. Claims 6 – 9, 13 – 16, 24 – 27, 31 – 34, 40 – 43 and 47 - 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified teachings of Katoh and Endo, as applied to claims 1 – 4, 10 – 12, 17 – 22, 28 – 30, 35 – 38 and 44 – 46, and further in view of Ran et al. (US 5,581,302).

Re claim 6, the modified teachings of Katoh and Endo disclose the system of claim 2.

But fail to expressly disclose said image processing unit, which is further configured to:

average every two neighboring pixel data elements in each line of said top field starting with first and second pixel data elements in each line of said top field to generate said first image sub-frame;

and average every two neighboring pixel data elements in each line of said bottom field starting with second and third pixel data elements in each line of said bottom field to generate said second image sub-frame.

However, Ran et al. disclose a technique, two facing pels along a horizontal row are averaged together to perform a linear upsampling operation. (Ran: Col. 8, lines 4 - 15 Fig. 7B)

Therefore, taking the combined teachings of Katoh, Endo and Ran et al., as a whole, it would have been obvious to a person having ordinary skill in the art to incorporate the display system as taught by Katoh and Endo to the technique as disclosed by Ran et al. to obtain a display system processing unit which averages every two neighboring pixel data elements to perform a linear upsampling operation.

Claim 7 -9 recite limitations that have been covered in claim 6. Therefore, they have been analyzed and rejected w/r to claim 6. With respect to said "linear function" in claim 9, see Ran: Col. 8 lines 5 – 14.

Claims 13 - 14 recite limitations that have been covered in claims 6 and 10. Therefore, it has been analyzed and rejected w/r to claim 6 and 10. (Also, see Ran: figure 7(B, C), 8(A, B))

Claim 15 recites limitations that have been covered in claims 8 and 12-14. Therefore, it has been analyzed and rejected w/r to claim 6 and 10.

Claim 16 recites limitations that have been covered in claims 9 and 12-14. Therefore, it has been analyzed and rejected w/r to claim 6 and 10.

Claim 24 recites limitations that have been covered in claim 6. Therefore, it has been analyzed and rejected w/r to claim 6.

Claim 25 recites limitations that have been covered in claim 7. Therefore, it has been analyzed and rejected w/r to claim 7.

Claim 26 recites limitations that have been covered in claim 8. Therefore, it has been analyzed and rejected w/r to claim 8.

Claim 27 recites limitations that have been covered in claim 9. Therefore, it has been analyzed and rejected w/r to claim 9.

Claim 31 recites limitations that have been covered in claim 13. Therefore, it has been analyzed and rejected w/r to claim 13.

Claim 32 recites limitations that have been covered in claim 14. Therefore, it has been analyzed and rejected w/r to claim 14.

Claim 33 recites limitations that have been covered in claim 15. Therefore, it has been analyzed and rejected w/r to claim 15.

Claim 34 recites limitations that have been covered in claim 16. Therefore, it has been analyzed and rejected w/r to claim 16.

Claim 40 recites limitations that have been covered in claim 6. Therefore, it has been analyzed and rejected w/r to claim 6.

Claim 41 recites limitations that have been covered in claim 7. Therefore, it has been analyzed and rejected w/r to claim 7.

Claim 42 recites limitations that have been covered in claim 8. Therefore, it has been analyzed and rejected w/r to claim 8.

Claim 43 recites limitations that have been covered in claim 9. Therefore, it has been analyzed and rejected w/r to claim 9.

Claim 47 recites limitations that have been covered in claim 13. Therefore, it has been analyzed and rejected w/r to claim 13.

Claim 48 recites limitations that have been covered in claim 14. Therefore, it has been analyzed and rejected w/r to claim 14.

Claim 49 recites limitations that have been covered in claim 15. Therefore, it has been analyzed and rejected w/r to claim 15.

Claim 50 recites limitations that have been covered in claim 16. Therefore, it has been analyzed and rejected w/r to claim 16.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yong Sim whose telephone number is (571) 270-1189. The examiner can normally be reached on Monday - Friday (Alternate Fridays off) 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YHS
9/11/2007

AMR A. AWAD
SUPERVISORY PATENT EXAMINER